GIS and Area - wide Monitoring
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Environmental agencies in the United States have considerable experience in the application of decision support systems which combine geographic information systems (GIS), global positioning systems (GPS) and relational databases to help solve environmental problems. As an example, staff of the U.S. Environmental Protection Agency (USEPA), Region 5, in Chicago have employed a variety of customized desktop GIS systems to support decision making at the site and watershed level. Applications have included sample design, data interpretation, remediation design, cost analysis, risk assessment, and clean-up construction and management. Many of the applications have been to the Great Lakes system and to other fresh water bodies. The most comprehensive and tested of these systems is called FIELDS (Fully-Integrated Environmental Location Decision Support), a collection of technical tools and applications which has been used for integrated assessment and decision support for contaminated sites, especially Superfund sites and water bodies with contaminated sediments, fish and soils.

Chinese agencies have also become very interested in these topics. The Chinese are quite expert in GIS and also in remote sensing techniques but have thus far emphasized studies of GIS data capture and structure, system design, and GIS analytical functions . They have not as yet done as much in applied applications that use GIS for on-site decision support. Chinese colleagues and organizations have expressed strong interest in making use of the capacity in FIELDS to integrate spatial technology for assistance in field sampling, chemical analysis and in the post evaluation process for decision making, potentially integrating all of this with remote sensing techniques. It is also of great interest to the Chinese that FIELDS had been used in the fresh water environments of the Great Lakes system and for contaminated sites. As a result, a USEPA Region 5 team was invited to provide two workshops in China on the use of FIELDS and other GIS techniques for environmental evaluation and decision making. One workshop was given at an international GIS conference in Beijing in June 1998 and one in Jiangxi Province, the location of Poyang Lake. During the visit to Jiangxi Province a proposal was made regarding the potential application of FIELDS to Poyang Lake.

The invitation to visit to China derived from a developing relationship between Region 5 staff and Chinese professionals and institutions, particularly the State Key Laboratory of Resources and Environmental Information Systems in Beijing, a division of the Chinese Academy of Sciences. Discussions have continued, including visits by senior members of the Key Laboratory to Chicago, and to Eastern Michigan University, which had an important role in fostering the relationship.

In April 1999, the Minister of the State Environmental Protection Agency (SEPA) of China, Mr. Xie, and his colleagues visited USEPA Region 5. During the visit the SEPA group was briefed on the FIELDS system and potential applications, including those for

contaminated sediments. SEPA has since indicated its interest in having FIELDS workshops in China and in applying FIELDS to support possible clean-up work in Chaohu Lake - one of China's priority watersheds. The project might also serve as a pilot for other areas, with Poyang Lake located in Jiangxi Province as second area of focus. USEPA Region 5 staff have been invited to visit Beijing for further discussions with SEPA of possible workshops and applications of FIELDS in China and to conduct a 3-day workshop on FIELDS in Shanghai. This visit is likely to occur in November of this year.

Further discussions should address ways and means that Chinese and U.S. agencies can improve their mutual capacity to monitor and evaluate fresh water rivers, lakes and other areas having industrial and/or urban impacts. Among the candidate approaches for further development are the effective use of GIS-based decision support systems for development of geospatial data bases, coordinated use of remote sensing information, acquisition of chemical and physical data, evaluation of contaminated sediment and biota, evaluation of toxic substances, modeling of impacts, risk assessment, visualization of data, and decision making.

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